

Arid-land birds and the nomadism concept

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Records of the sudden arrival of birds at newly occurring resources, and apparent lack of evidence of other movement strategies, appears to be the basis of a population or species of arid-land bird being termed nomadic (Brooker *et al.* 1979, Thomas 1984, Dean 1997, 2004). However, there are obvious difficulties in distinguishing potential nomads from individuals or groups with other spatial strategies when using observations of species that occur over large areas poorly covered by ornithologists. Wiens (1991) noted that nomadism has often been considered a characteristic feature of arid-land birds but that such assessments were based primarily on anecdotal accounts or short studies at single locations. Nix (1976) stated 'Too often, bird movements [in Australia] are labeled nomadic because this provides a ready-made answer to otherwise puzzling and cryptic observations.' The Wattled Starling *Creatophora cinerea* of Africa is regarded as nomadic, though Craig (1996) acknowledged that the itinerary of individual flocks was unknown. Some studies of claimed avian nomads have suggested or shown other patterns of spatial use (Wyndham 1983, Jones 1989, Zann 1996). Dean (2004) considered there to be 233 nomadic bird species in the terrestrial habitats of the world's arid lands. However, the evidence for the nomadic nature of these species is largely circumstantial. Indeed, apart from Australian and southern African species, the evidence is often tenuous. Keast (1968) and Dean (2004) also referred to 'local nomads', an apparent contradiction in terms. According to the latter author there are 433 locally nomadic arid-land species. The purpose of the present note is to attempt to clarify the nomadism concept and discuss its usage.

In a work on Australian birds, Keast (1961) defined nomadic species as those that undertake extensive group movements of irregular amplitude and direction and breed wherever conditions happen to be suitable. He stated that some nomadic species are sedentary for a year or more, moving with the onset of a drought, some are nomadic in part of their range only and that 'In the more typical nomads, however, the movements are general, irregular, occur frequently, and are of considerable amplitude. Many have, seasonally, a south-north bias to the movements.' Brown *et al.* (1982) considered that avian nomads move about very irregularly, taking advantage of temporarily favourable conditions to breed, sometimes in large numbers, then moving away again. Shields (1983) defined a nomadic organism as one in which no stage of its life cycle shows site tenacity, individuals wandering more or less widely throughout their lives. Avian nomads are birds that move from place to place without regard to season or direction (Davies 1984). 'Most fabled are the [avian, arid-land] nomadic species, which undertake erratic, unpredictable, and large-scale movements in response to poor conditions in one area and/or good conditions in another...' (Wiens 1991). According to Lidicker

& Stenseth (1992) and Zann (1996), nomads are in a chronic state of dispersal and fail to establish a home range anywhere. Dean & Milton (1999) noted that avian nomads may move over hundreds of kilometres to find rainfall patches. Chan (2001) considered avian nomadism to be where birds wander constantly to wherever conditions are suitable for breeding and foraging, annual variations occurring in the routes taken and in the distances travelled. Finally, Dean (2004) defined avian nomads as 'Species that move somewhat unpredictably on a regional scale, varying in numbers of individuals present at any one locality; characterized by short or long absences, during which no individuals may be present for periods ranging from months to several years'.

Clearly, nomads are lifetime wanderers that move from resource patch to resource patch. The directions taken by nomads are opportunistic and any return to their natal area is fortuitous. Nomads could show to-and-fro movements if the pattern of rainfall tended to produce seasonal changes in resource distribution, resources occurring in different areas in different seasons. However, any rains failure, diminution or delay, or reversal of the usual pattern of rainfall, would produce an appropriate change in nomads' movements as they search for and track resources. Nomads will remain at a site whilst conditions are favourable.

The expression local nomad refers to a pattern of spatial use different from nomadism. Keast (1968), in a review of seasonal movements by Australian honeyeaters (Meliphagidae), defined local nomads as members of populations or species where nomadism is restricted 'to an amplitude of a few miles or to the general district or area of breeding'. Dean & Milton (1999, 2001) noted that local nomads remain in one general area, forming flocks when not breeding, and wandering locally. Dean (2004) defined local nomads as 'Species that wander or move on a landscape scale, forming flocks or small groups, but individuals always present at any one locality'.

Rather, 'local nomads' are residents, searching and foraging in a home range. Davies (1984) considered that nomadism in desert birds differs only in degree from the movements of a resident species utilising those parts of its territory or home range where resources happen to be most abundant. However, residents benefit from increasing familiarity with their home range. Use of the term local nomad perhaps stems from an earlier reported dichotomy. Heape (1931), discussing nomadism, distinguished between animals that wander freely and those restricted to wandering within a defended area, e.g. peoples roaming over tribal areas. To avoid confusion with nomadism, so-called local nomads would be better described as local wanderers, rovers or roamers.

Dean (2004) noted species in which immatures are nomadic and adults are not, and where migrants in their non-breeding quarters are nomadic. Rowley (1975) referred to partial nomads, which return to traditional breeding sites, and considered the Inland Dotterel *Peltohyas australis* of Australia a possible example. Ford (1989) stated 'At its most extreme nomadism can occur at any time of year and involves the movement of a significant proportion of the population outside its normal

range.' Heape (1931) felt that all species of animals capable of locomotion are nomadic to some extent. Instead, terms other than nomadic and nomadism should be used to describe wandering that is part of non-nomadic lifetime spatial strategies.

Jennings (1995) considered that many arid-land birds in Arabia, especially larks, are nomadic in pursuit of suitable breeding and feeding conditions but that the majority of movements go unnoticed through poor observer coverage in remote areas. He stated that there had not been any thorough study of nomadism among birds in Arabia but hoped that ringing schemes would help. Marking programmes are essential to elucidate the movements of suspected nomads, as the following studies demonstrate.

Wyndham (1983) carried out field work including transect surveys and analysed published and unpublished records, questionnaire surveys, ringing records and nest record cards to assess the movements and breeding of the apparently nomadic Budgerigar *Melopsittacus undulatus*, which occurs widely in Australian arid lands. He proposed, rather, that when food becomes scarce, experienced Budgerigars move towards traditional locations and naïve birds either follow or move at random. When a location with ample food is found, traditional or otherwise, they settle and if nest holes and water are available they breed.

The granivorous Red-billed Quelea *Quelea quelea* of Africa was thought to be the textbook example of a nomadic species, roaming opportunistically in marauding swarms (Jones 1989). Subsequent research used various techniques to establish the location and movements of birds, such as mass-marking with fluorescent pigment particles and monitoring radio-tagged birds from a helicopter (Bruggers & Elliott 1989). This species, in fact, lays down deposits of pre-migratory fat prior to undertaking a to-and-fro early-rains / breeding migration associated with advancing rain fronts (Jones 1989).

Some authors have treated the Australian Zebra Finch *Taeniopygia guttata* as nomadic. However, Zann (1996) proposed, on the basis of ringing and other data, that a Zebra Finch population is composed of a number of nesting colonies in a large home range within which is located at least one watering site. Individuals move between colonies within the home range. Depending on local conditions nesting colonies may be deserted in favour of others in the home range. In dry periods the birds can also wander outside the home range, whilst in long periods of drought the birds may undergo large-scale movements away from the home ranges that can result in the establishment of populations at new sites.

Dean (2004) included the Houbara Bustard *Chlamydotis undulata* as a nomad though indicated that the species can also be resident. A ringing and satellite-tracking programme (41 individuals equipped with satellite transmitters) has further confirmed the migratory nature of Houbara in the eastern range of this species, in Asia (Combreau *et al.* 2001). Hingrat *et al.* (2004) studied movements of Houbaras in eastern Morocco. Five years of field surveys were conducted which included tracking 30 radio-tagged Houbaras from the ground or air for at least one complete year. Six males and six females were followed for three successive breeding

seasons. The mean annual home range of males (17 km²) was smaller than that of females (146 km²). These Houbara appeared sedentary with relatively limited home ranges, and successive years of fidelity to home ranges further indicated lack of nomadism (Hingrat *et al.* 2004).

The movements of Emu *Dromaius novaehollandiae* in Western Australia were studied using counts either side of a 190-km section of a barrier fence, 1959–1972, and by ringing (Davies 1984). The directions of the birds' movements appeared mainly consistent with nomadism. When there is little rainfall large shifts of the Emu populations occur, out of dry places and into those that have received recent rain. In one year the normal pattern of precipitation reversed and the pattern of Emu movements reversed accordingly. Dingle (1996) commented that Emu movements appear to be 'truly migratory, rather than simply extended foraging' as Emus sometimes pass through good feeding grounds when apparently moving towards recent rainfalls (Davies 1984), i.e. are undistracted by favourable habitat. Emus might, though, be choosing the prospect of even better or more extensive feeding grounds.

Nomadism can be a useful paradigm for understanding the movements of arid-land birds from area to area. However, it may be only one of many different lifetime spatial strategies employed.

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The valid specific name of the Streaked Fantail

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In Dickinson (2003) the Streaked Fantail is named *Rhipidura spilodera* and the nominate form was described by G. R. Gray (1870). Four other subspecies were listed. As part of work toward a fourth edition of *The Howard & Moore complete checklist of birds of the world*, we observed that a second subspecies also dates from 1870 and that there was a possibility that the New Caledonian form might have been named earlier.

Gray's *Rhipidura spilodera* dates from the May issue (no. xxix) of the *Annals and Magazine of Natural History*. We have examined the original description of *Rhipidura verreauxi* by M. E. Marie¹ in the *Actes de la Société Linnéenne de Bordeaux* 27(4): 326–327. This is followed on pp. 327–328 by a 'Catalogue complet des espèces observées' in New Caledonia. At the foot of p. 328 the date '30 avril

¹ The name Marie appears in small capitals. Wynne (1966) rendered it as Marié. Wynne noted that he was a conchologist, and the Royal Society (1879) list papers in 1867–70 on that subject, some of them from Nouvelle Calédonie, by 'Marie, Ed.' (with no accent).